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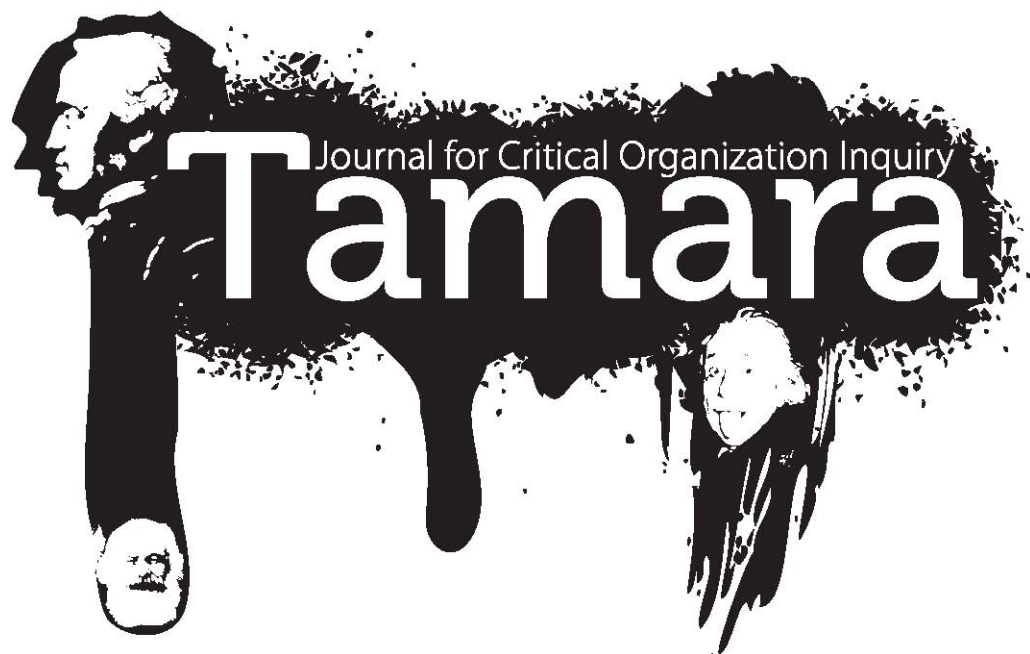
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The Multifunctional Organization: Two cases for a critical update for research programs in management and organization

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Keywords

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Computer program

Abstract

Organization and functional differentiation are considered key principles of modern societies. Yet, within organizational studies little research has been conducted on the interplay of function systems, organizations, and society. The few existing studies suppose trends to more functional polyphony. The cases presented in this article, however, support the idea that organizational multifunctionality is the standard case rather than a special case of organization. It is furthermore shown that organizations can change their function system preference and that the translation between function systems can be an organization's main function. A Google Ngram view on functional differentiation finally furthers the idea that changes of function system preferences are not only a matter of individual organizations, but also a matter of entire societies.

The organization of organization: an introduction

When asked about their identity, organizations start to shimmer, which is fascinating as long as we do not want to better understand why this gleam occurs. If this understanding, however, is our intention, then we find our visions blurred by the 'semantic tricks' of the oscillating organization (Andersen & Born, 2000). It is therefore often the most intriguing approaches that lead to the most unpleasant questions, such as how much organization a given organization needs (Baecker, 1999). Kept in mind, a short question of this type constantly makes us switch not only between two sides of the same distinction, but also between two different distinctions that more or less accidentally share the same token. In such a way, a few words are quite enough to open up an ample scope of observation in which observation itself must keep on the move in order to come across identity.

Initially, modernity enabled, enforced, or essentially *was* the token of this observational mobility. Henceforth, identity was no longer based on (e)state, but rather unfolded as a history of movements in the social realm. Since movement involves encounter with the unknown, mobility expanded the horizon of alternatives and thus created a growing observation of decision systems and criteria. It is therefore not for nothing that, together with functional differentiation,

organizations are considered key features of modern societies (Beck, Bonss, & Lau, 2003; Berger, 2003; Bergthaller & Schinko, 2011; Kjaer, 2010; Martens, 2006).

Given their immense significance, the relation of organization and functional differentiation is underexplored. Though a considerable part of Earth's population will find it easy to fix the bug in the subsequent classification (cf. Table 1), we still do not know much about how and why persons and organizations refer to function systems.

Table 1: Bugs in a Black Box Relationship (source: own table)

Function System	Organization
Political System	Party
Economy	Business
Science	Laboratory
Art	Atelier
Religion	Church
Legal System	School
Sport	Sports Club
Health	Court
Education	Hospital
Mass Media	Publisher

While organizational diversity is routinely cross-tabled against any kind of segmental or strata variables, an organization's function system reference is most often treated as constant. In this sense, a court is considered an organization of the legal system, a hospital an organization of the health system, and a school an organization of education. Thus contained in the progressively solid boxes of functional differentiation, the erratic organization found rest again.

Nonetheless, since the turn of the millennium, the idea that organizations can be embedded in function systems has been challenged by an emerging body of concept and case studies on the functional multi-referent, polyphonic or heterophonic nature of organization (Andersen, 2000, 2003; Andersen & Born, 2007; Lieckweg & Wehrsig, 2001; Tacke, 1997, 2001a; Tacke, 2001b; Thygesen & Andersen, 2007; Wehrsig & Tacke, 1992). Yet, while the concept of multi-reference supposes that organizations increasingly refer to more function systems still only through the lens of their primary function system, the latter two concepts assume a general trend to organizations without a primary function system reference. Despite the differences, all concepts have in common that they point to the fact that banks organize private views, hospitals keep budgets, and universities are now overcoded with third missions (Jemielniak & Greenwood, 2013; Slaughter & Leslie, 1997). A growing number of case studies hence suppose a change to increasingly multifunctional organizational structures. The problem with the counter-concepts of functional monophony, then again, is that they start from theoretical assumptions that can hardly be brought in line with empirical evidence: On the one hand, the concept of organizational multi-reference is based on the assumption that organizations necessarily feature one ineluctable primary function system reference, which consequently cannot be subject to change. On the other hand, the idea of polyphonic or heterophonic organizations without any function system preference at all, i.e., of an organization that unbiasedly refers to more than one or even all function systems, refers to a rather improbable ideal case of functional polyphony resulting from snapshots rather than from long-term observations of organization. Both approaches hence considerably limit a systematic exploration of the relationship of two of the most relevant aspects of modern societies: organization and functional differentiation. The key question of the present article therefore is how to open up the concept of functional polyphony to research in organizational diversity and change management.

In the following, we suggest complementing existing research programs on organizational change with a particular focus on the differences made by organizational function system references. Unlike the existing approaches in the field, we consider functional polyphony neither a desired outcome of change management nor a recent trend in organization. Rather, organizations will be introduced as programmable and thus inevitably multifunctional decision machines. This claim is supported by the discussion of the case of the New Zealand cooperative *Fonterra* as an example of the conversion of agricultural cooperatives from political to economic ventures, where we will demonstrate that organizations can be

reprogrammed in terms of changes of their main function system references. Furthermore, a brief *Google Ngram* view of trends in functional differentiation will give circumstantial evidence that fundamental changes of function system preferences are not limited to individual organization, but also apply to the organization of society. The second case of the *Contergan Foundation for People with Disabilities* will complement these asynchronous cases for multifunctionality by a case of synchronous multifunctionality. In other words, we will show that we cannot only observe the conversion of an organization's main functions, but also the conversion of functions as an organization's main function, which is why we finally suggest considering multifunctionality the standard rather than exotic case of organization.

Organization and functional differentiation: a research gap

In the mid of the 20th century, Mikhail Bakhtin (1984) introduced the originally musicological metaphor of polyphony to literature studies in order to better satisfy and capture the complexity of Fjodor Dostojewski's oeuvre. The concept was later transferred from literature to linguistics (Allemann-Ghionda, 2003), political sciences (Harney, 1996), and religious studies (Sterkens, 2001) and also progressively applied to organizational research (Hazen, 1993, 1994, 2006; Kronberger, Clegg, & Carter, 2006, 2007), where it complemented or framed extended diversity discourses (Sullivan & McCarthy, 2008) as well as approaches to narrative consulting (Boje, 1995; Boje, 2008; Westwood & Clegg, 2003).

Polyphony in terms of diversity resulting from an encounter of both segments and strata is quite familiar to organizational research. Be it cities or nations, cultures or milieus, age cohorts, or genders, the preferably comparative analyses usually take segments for nominal data with an inherent need for stratification in terms of performance indicators, eco balances, income distributions, or satisfaction indices. 'Polyphony versus hegemony operates as a central trope of critical management and organizational studies' (Letiche, 2010, p. 262) or 'is characteristic to the modern political history of communication' (Eriksson, 2008, p. 283) and promotes critical approaches to the monologues of the privileged (Barry & Elmes, 1997; Gardiner, 1992) and a deliberate focus on those voices that under normal circumstances are silenced out (Höpfl, 1995). This approach expressively involves the active intervention in organizational systems that eliminate diversity, equality, and participation.

„Managing the polyphonic organization means listening carefully to the voices of others and mediating between different language games. (...) Speaking managerially, polyphonic organization has many advantages. Arguably, employees will be more empowered, motivated, and committed. The organization can position itself differently and realize a competitive advantage through reputation management by marketing itself as democratic, open, and multicultural. (...) Drawing on a wider range of perspectives and heterogeneous resources can improve decision-making processes (...) Finally, a polyphonic organization is less standardized and hierarchical, which provides the necessary flexibility to cope in a fast-changing environment” (Clegg, Kronberger, & Pitsis, 2005, p. 335).

Sometimes, one seems to actually assume the existence of some type of organizational subconscious, which is constantly suspect of self-alienation and other forms of deformation. Exactly the most silent patients are therefore quickly taken for particularly ill:

„(S)ilences and silencing can exact a terrible toll in depression, severed relationships, derailed careers, and missed opportunities for learning and growth. Silences impact not only the individual (...), but also work group relationships and the organization's effective accomplishment of its mission” (Hazen, 2006, p. 245).

The main criticism of the mainstreams of research in organizational polyphony, however, is not the omnipresence of psychological metaphors for essentially social phenomena (Belova, King, & Sliwa, 2008), but rather the neglect of functional differentiation as both a category of variables and a key feature of modern societies. In fact, a systematic approach to functional differentiation is hardly considered relevant even if the research interest is, just for example, on science centers (read: not parties, churches, or hospitals) and their need to realize 'a balance between the multiple functions that are mainstreamed in the 'parent' institutions (science, formal education, the leisure industry and the museum)' (Tlili, 2008, p. 320).

Only a small group of researchers actually consider organizations interfaces not only of segments or strata, but also of function systems. According to Tania Lieckweg, Christof Wehrsig, Ruth Simsa, and Veronika Tacke (Lieckweg

& Wehrsig, 2001; Simsa, 2001; Wehrsig & Tacke, 1992), organizations are functionally multi-referent, i.e., they are capable of sourcing decision criteria from all function systems while still relying on one particular system whenever time really is critical or the criteria drawn from the other sources contradict. The multi-referential concept of organization, however, contradicts the Niels Åkerstrøm Andersen's (2003, p. 164) concept of functional polyphony, according to which a '*homophonic* organization is one that has a primary codification, which regulates the relevance of codifications', while 'an organisation is *polyphonic* when it is connected to several function systems without a predefined' (167). Against the background of this definition, Andersen then observes a trend to more functional polyphony. This approach has recently been radicalized in terms of the observation of a trend to organizational *heterophony*, i.e., to organizations for which all function systems are of equal importance (Andersen, 2000, 2003; Andersen & Born, 2007).

Obviously, both the concept of functional multi-reference and the concept of functional polyphony or heterophony cause issues with applying the concept to research in organization. On the one hand, in assuming the existence of an ineluctable primary function system reference, the concept of functional multi-reference abstracts from the option of analyzing cases of the change of an organization's primary function system reference. On the other hand, previous concepts of functional polyphony or heterophony seem to mistake the ideal of organizations without any function system preference for an empirical finding rather than a theoretical background for empirical research.

In order to open the concept of functional polyphony to research in organizational diversity and change, the present article challenges the idea of emerging trends to multi-referent, polyphonic, or hetero-phonic organizations and rather considers them a compelling basis for a null hypothesis of future research in organization. In the following, it is rather assumed that perceived increase in the scope of organizational function system references represents just a semantical adjustment to the always multifunctional structure of modern organization. Evidence for the idea that organizations are multifunctional by nature will be given in terms of two cases and circumstantial evidence drawn from a culturomic analysis of organizational environments. In doing so, we will base our argument on the assumption that organizations should be conceived as programmable thus inevitably multifunctional decision machines.

Organizations as computers: A theory statement

Notorious for its liability to newspeak, the social systems theory defines organizations autopoietic systems of decision (Luhmann, 2006a, 2006b). The thin red punch line hidden here is that decisions are considered forms of communication. Communication is not regarded as particular states of mind transferred from senders to receivers, but rather as links of chains of mutual and therefore supra-individual forms of behavioral programming. Decision systems consequently consist neither of mental performances nor of humans, individuals, persons, or further actors to which decisions are often attributed.ⁱ Rather, the theory assumes that all these entities and their identities are not origin(s), but results of communication (Luhmann, 1984, p. 155). In fact, individual persons are made at the interfaces of interactions, which is an idea that Georg Simmel (1922) partly anticipated by what is translated as his comments on 'The Web of Group Affiliations' (Bendix, 1969, p. 125)ⁱⁱ. In both cases, individual persons are not taken for a history of states of mind or body, but rather for 'their' interaction history. Both authors also agree on the idea that patterns of interaction significantly changed during the transition from the medieval to the modern world.

Medieval societies allowed for a comparably low degree of both physical and social mobility: whether merchants, monks, or margraves, they stayed at the place in space and society they were born to, which considerably limited the scale and scope of interactions that common people could be involved in. The progressive removal of feudal barriers, however, soon led to the observation that persons can, and more and more have to, take increasingly different roles in a considerably growing number of interactions. This shift of observation from role having to role-taking made once undivided individuals discover their individuality as token for the problem of staying the same while having to play so many different roles, day-in, day-out, in an increasingly liquid modernity (Baumann, 2000). This is when organization enters the stage: The larger the repertoire of potentially accessible roles, the more likely the actual role taking is taken for the notification of a decision (Luhmann, 2006a, p. 66f). Again, however, this reading of decision does not refer to the individual individuals' mental processes, but to a special case of communication. A particular behavior must be *understood* as an act of role taking (rather than a function of fate) so that it appears as a decision. In the light of more and more alternatives, even the mere continuation of tradition can then be considered a choice. Organization emerges whenever taken decisions are observed to have impact on further decisions in a manner similar to Western musical composition, where the third note in the staff usually already determines the mode (*major or minor*) of the entire piece of music. It hence takes less than a handful of decisions to establish a basic pattern against which further decisions appear as either suitable or unsuitable. In this manner,

taken decisions can serve as decision programs that guide subsequent decisions. Path-dependency and lock-in effects are therefore constitutive features rather than unintended side effects of organizations.ⁱⁱⁱ In this sense, organization emerges whenever taken decisions can be considered reference points of further decision. A second tying of two notes already defines the composition's mode (major or minor). In the further course of the melody, once established sequences may not perfectly prevent a change of mode, but nonetheless strongly moderate the frequency, the conditions, and the meaning of variations. Still, it is important to note that there is no predecessor to a first tone, which also implies that the decision on the second tone is based on a premise that is not based on a premise itself. There is thus a hollow core at the heart of every composition, to which even the furthest tone is inevitably linked. In just the same way, contingency must be assumed as the very basis of all forms of organization; proof of this fact being entire industries specialized in training managers how to hide this fact. On the one hand, the fact that all organizational claims for directive authority are essentially baseless in the end actually seems to shake organization to the core. On the other hand, we find that the very opposite is true: 'Only those questions that are in principle undecidable, we can decide' (von Foerster, 1992, p. 14). In fact, there would not be any need for further decision if subsequent decisions were reducible to the initial one. Deprived of alternatives, the decision machine (Nassehi, 2005, p. 185) called organization would cease to exist.

The fact that organizations both feature an inherent mechanism for the detection of alternatives even to its own foundations supports the assumption that organizations may be subject to most fundamental change. We therefore conceive of organizations as programmable, or maybe even self-programming, decision machines capable of processing all forms of differentiation. It follows that organizations are characterized best in terms of the frequencies in which they refer to what forms of differentiation in order to link decisions with suitable decisions.

Organization and functional diversity: on how to not to tell a rich story

The following methodological statement starts from the assumption that the categorical separation of theory and method is a mistake (Elias, 1978). In fact, this statement is true for any theory that applies its own distinctions not only to the objects of investigation, but also to itself, thus making sure that theory indicates how its observations come about and can be replicated. In these cases, theory already is methodology. A research venture based on social systems theory, i.e. a social theory deeply rooted in a culture of self-application and a circular epistemology (Schiltz 2007), can consequently be considered methodologically robust. The intention of such a research venture is then neither causal analysis nor theory discovery, but rather the use of theory as a method of discovery. In this sense, the present article is focused on examples for the difference functional differentiation makes in the analysis of organizational identity.

The expedition starts from the concept of social differentiation. 'Ever since there has been sociological theory it has been concerned with social differentiation' (Luhmann, 1990, p. 423), an intrasystem process of subsystem formation (Luhmann, 1977, 1997b). In this context, society is conceptualized as the comprehensive social system, i.e. the system of all communications (Luhmann & Barrett, 2012, p. 40ff). The concept of functional differentiation then refers to a communicative form of subsystem formation that replaced former forms as the dominant form of social differentiation.

The first known forms of subsystems of society were families and tribes, which coexisted with other subsystems of the same type. Early societies are therefore said to be differentiated into identical and co-equal segments of society. During the Neolithic revolution, the situation changed as soon as various individual settlements ascended toward centers, which turned others into peripheries. This center-periphery form of differentiation was soon superposed by stratification, which is commonly associated with the formation of hierarchical social orders, for example, the Indian cast system or the Occidental Estates of the realm. Stratified societies defined persons into ranked hereditary communities and allowed for only limited social mobility, if at all. In the end, it was mobility that changed the static order. The movable types of Gutenberg's printing press, the Central-European rural exodus, or the gentrification of too many commoners weakened the constitutive distinction of nobles and commoners. Finally, stratification for its own part was superposed by a distinction so fundamental to present mindsets that the following categorization of animals is essentially no longer considered a serious classification:

'(a) Belonging to the Emperor, (b) embalmed, (c) tame, (d) sucking pigs, (e) sirens, (f) fabulous, (g) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camelhair brush, (l) et cetera, (m) having just broken the water pitcher, (n) that from a long way off look like flies' (Borges & Weinberger, 1999, p. 231).

In fact, modern man would rather not assume a siren and a pig the same type of animal simply because they both belong to an emperor and consider a farmer's pig fundamentally different from one of the emperors'. In return, however, larger parts of the world population would today be able to find the mistakes in the equations mentioned in the introduction (cf. Table 2). Society can therefore not only be differentiated into a) similar and even segments, b) similar and uneven centers and peripheries, and c) dissimilar and uneven strata, but also into d) dissimilar and even function systems (cf. Tab. 2).

Table 2: Social Differentiation (Roth, 2014a, p. 442)

		Equal	
		+	–
Similar	+	Segmentation (Families, tribes, states, etc.)	Centralization (Civilizations, empires, etc.)
	–	Functional Differentiation (Economy, Science, Art, etc.)	Stratification (Castes, estates, classes, etc.)

“Functional differentiation selects communication processes around special functions to be fulfilled at the level of the society itself” (Luhmann, 1977, p. 35). These functions have evolved as an epiphenomenon of modernization in terms of communications centered on symbolically generalized communication media such as money, power, truth, or believe. The point in this form of differentiation is its multi-inclusive nature: While elements of earlier social subsystems could only belong to one subsystem (e.g. a nobleman could not have been a commoner, at the same time), one and the same social event can now simultaneously be economized, politicized and mediatized.

Despite their obvious existence and uncontested importance to modern society, there is still little consensus on necessary and sufficient conditions for the definition of function systems. Yet, when looking at existing working definitions and non-exhaustive lists of function systems (Andersen, 2003; Baecker, 1994; Henkel, 2010; Künzler, 1987, 1989; Luhmann, 1997a; Reese-Schäfer, 1999, 2007), a hardcore list of ten function systems can be extracted (Roth, 2014c): the political system, the economy, science, art, religion, law, health, sport, education, and the mass media.^{iv} These ten function systems differentiate and re-duplicate society by the binary re-coding of communication according to a specific symbolically generalized communication medium. Each function system applies only one single code, which it also applies exclusively. For example, science, and only science, is all about the medium truth, binary coded as true or untrue. Scientific programs and theories decide on when the code of science is properly applied. The function of science is to provide society with ongoing knowledge communication (cf. Tab. 3).

Table 3: The Function Systems of Society^v

System	Code	Medium	Program	Function
Political System	Superior/Inferior	Power	Ideology	Control
Economy	Payment/Non-Payment	Money	Price	Distribution
Science	True/Untrue	Truth	Theory	Knowledge
Art	Innovation/Imitation	Style	Taste	Creation
Religion	Immanent/Transcendent	Belief	Confession	Revelation
Legal System	Right/Wrong	Norm	Law	Compliance
Sport	Success/Failure	Achievement	Goal	Performance
Health System	Ill/Healthy	Illness	Diagnosis	Therapy
Education	Placeable/Un-placeable	Career	Test	Placement
Mass Media	Informative/Non-informative	Record	Topic	Reproduction

While it can be considered impossible to belong to both the estate of the nobles and the estate of the commoners or to two castes at the same time, persons can be included in all of the function systems. This multi-inclusiveness also applies to organizations. Organizations therefore can be studied with regard to their references to one, some, or all of the function systems, e.g., in terms of the frequency of references to particular function systems. What is more, we are interested in

demonstrating that this frequency is subject to change in individual organizations as well as with regard to the organization of society.

In the following, we will present two examples of organizational multifunctionality, i.e. of ways of how to observe organizations as defined by their – changing – relationships to the different function systems of society. In doing so, we will right away be required to limit expectations of the richness of the story told (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Yin, 2008). Normally, the following is true:

‘In a single-case study, the challenge of presenting rich qualitative data is readily addressed by simply presenting a relatively complete rendering of the story within the text. The story typically consists of narrative that is interspersed with quotations from key informants and other supporting evidence. The story is then intertwined with the theory to demonstrate the close connection between empirical evidence and emergent theory’ (Eisenhardt & Graebner, 2007, p. 28).

From our theoretical point of view, however, organizations do not consist of humans, motivations, machines, or factory buildings (Baecker, 2006). What is more, organizations are systems of decisions rather than networks of interactions. As traces of decision communication, the tokens we are looking for are compact by nature. In the case of our form of research in organizations, the key is therefore not in a closed and comprehensive analysis of interaction in organization, which would, regardless of the diligence of conduct, only result in indirect information on organizations.^{vi} Rather, we will focus on two compact cases that illustrate why we propose to consider organizations (re)programmable and multifunctional decision machines. The selection of the cases was driven neither by theoretical sampling nor due to privileged or unusual access to data. Rather, the cases represent observations accessible to everyone who applies the presented theory-method. In fact, the basic claim made in this context is that, in focusing only segmental and strata variables, the majority of researchers in organizational polyphony have used only two out of three possible object lenses of the ‘polyphonic microscope’; and that those few who have already used the third lens have taken snapshots rather than made films of what they have observed in terms of functional polyphony. In this sense, the following cases represent observations of functional polyphony against the background of different time horizons. While the first case of the New Zealand Cooperative Fonterra illustrates that organizational function system preferences can be subject to long-term conversions, the second case of the German Contergan Foundation shows that the constant conversion of function system references can even be the core function of an organization. In addition, we will contextualize these cases by considering big data (Manovich, 2012) in terms of a *Google Ngram* view on trends in functional differentiation.

Two cases and a glance on big data: exemplary approaches to the multifunctional nature of organizational

In the present section, we are sketching a brief history of the New Zealand cooperative *Fonterra*. Looking at organization and functional differentiation through a systems theoretical lens, Fonterra makes a case for the well-documented fact of the conversion of agricultural co-operatives in the course of the liberalization of the World agricultural market (Chaddad & Cook, 2004; Collins, 1991; Fulton, 1995; Ortmann & King, 2007). This case has been chosen to illustrate the fact that organizations can be reprogrammed in terms of their function system preferences, which in this case refers to a change from a political to an economic organization.

Using the *Google Ngram Viewer*, a graphical search interface that allows for word frequency analysis of the Google book corpus, we will subsequently scan one of the largest available text corpuses (Bohannon, 2011a; Michel et al., 2011) for changes of the word frequencies of the function system denominations, which can be interpreted as indicators of their changing importance (Bohannon, 2011b; Kloumann, Danforth, Harris, Bliss, & Dodds, 2012; Ophir, 2010) in a larger social segment, i.e., the English speaking world between the years 1800 and 2000.

Quite unlike the first case (which can be considered representative of a global trend), we will finally focus on the case of the *Contergan Foundation for People with Disabilities*, which is in line with a straightforward theoretical sampling focused on ‘unusually revelatory, extreme exemplars, or opportunities for unusual research access’ (Eisenhardt & Graebner, 2007, p. 27). Again, however, the focus is not on the richest, but rather on the most compact form of description as indicated by the fact that our discussion will be centered on a single table that, comprehensively, illustrates the organization’s function.

Case 1: The Fonterra Co-operative Group

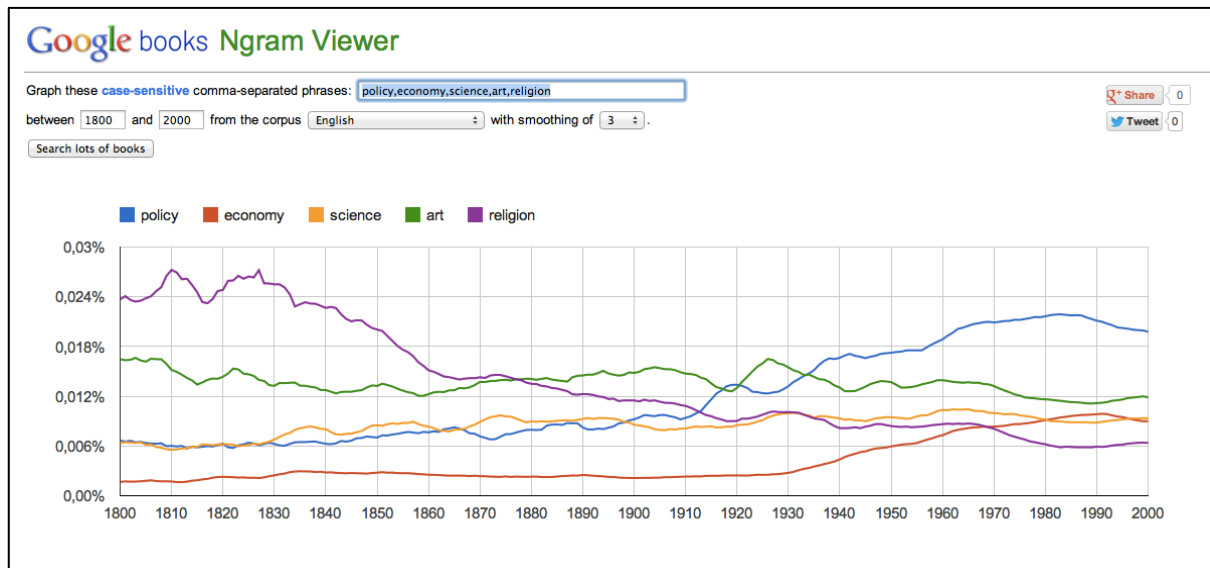
Fonterra Co-operative Group Ltd. is a multinational dairy cooperative owned by more than 10,000 New Zealand farmers, who supply milk to Fonterra. The roots of the cooperative date back to the late 19th century, when the first dairy farmers established production and trade cooperatives. Due to the favorable climatic conditions in New Zealand, the growing cooperatives soon produced more than the home market could absorb. New or more productive members turned from growth factors to a problem, whose solution was export. At the time, the opening of foreign markets was, however, not only a question of money, but also a political issue: New Zealand was a dominion of the Commonwealth, and the UK the main market. In this situation, the New Zealand government installed the Dairy Export (Produce) Control Board (Dairy Board) in 1923, which soon acted as the export interface of 90% of New Zealand's milk production. Now a state-run institution organized dairy export marketing, while the cooperatives received a state-guaranteed compensation that could only be kept stable by annually increasing subsidies (Baker, 1965, p. 306). Shortly after World War II, the Dairy Products Marketing Commission was established giving industry and government shared responsibility over export sales. As the representatives of New Zealand's cooperatives were now involved in foreign economic decision-making, export marketing gradually became the cooperative's internal problem. As an end to the privileged trade relations with the UK was conceivable, the marketing organization was again re-structured: In the Dairy Industry Board established in 1961, 11 out of 13 directors were co-operative representatives, while the two remaining directors were nominated by the Ministry of Economic Affairs. The Board acted as the exclusive exporting and overseas marketing arm of the New Zealand dairy industry and linked manufacturing and industry growth plans with export market requirements. In 2002, Fonterra and Nestlé developed Dairy Partners America (DPA) to gain market shares in the Americas. Today, Fonterra is still discussing the implementation of an internal market for shares (which equal rights to sell milk to Fonterra and thus to the world market).

Supporting Material: A Google Ngram view

Since its start in 2004, the Google Books project has digitalized some 15 million of the estimated 115 million books ever published. In 2007, a Harvard research team (Michel et al., 2011) recognized the potential of the Google Books corpus, performed quality checks, and finally reported the compilation of a corpus of more than five million books covering seven language areas and 600 years. The development of this enormous data soon raised hopes of a golden age of digital humanities (Johnson 2010) and of new types of historical knowledge (Ophir, 2010), and gave birth to the discipline of *culturomics* as 'the application of high-throughput data collection and analysis to the study of human culture' (Michel et al., 2011, p. 181). The use of the Google Books corpus is facilitated by the *Google Ngram Viewer* - an open-access interface that allows for trending (Manovich, 2012) in terms of the production of customized time-series plots for entered search terms.

An input of perhaps the most important five function systems, namely political system,^{vii} the economy, science, art, and religion, then gives the following picture (cf. Fig. 1):

Figure 1: Word Frequency Shares of Selected Function Systems Denominations in the Overall English Language Google Books Corpus (source: own Google Ngram enquiry; for the comprehensive analysis cf. (Roth, 2014c))



We find that religion was the most important^{viii} function system until about 1870, followed by art, which at about the time of the dawn of World War II, was finally overtaken by the political system. In addition, we find that the politicization of society (in terms of the English language area) is paralleled by a certain economization that, nonetheless, never exceeded a certain level (and never surpassed art throughout the entire process of ‘economization’).

This sneak peek at trends in functional differentiation, a more comprehensive analysis of which has recently been presented by Roth (2013b; 2013c, 2014c), supports the idea that function systems references have featured considerable fluctuation for a long time and not only within particular organizations, but also at the level of entire societies.

Case 2: The Contergan Foundation for People with Disabilities

Between 1957 and 1961, German drug-maker Grünenthal GmbH distributed the still infamous tranquillizer Contergan (Thalidomide). Contergan led to serious birth deformations when taken by pregnant women. Grünenthal received more than 1,600 insistent warnings throughout the year of 1961. Even more, the company never denied that it was perfectly aware of the drug’s negative impact as of November 16, 1961. Even so, the drug was still distributed until November 26, 1961, which is the day after the publication of a relevant article in the German newspaper ‘Welt am Sonntag’. By this date, a total number of at least 5,000 children had been born with serious birth deformations, not to mention an indefinable number of prenatal deaths. The criminal case against the company was closed in 1970 after 283 days in court. Eight months before, Grünenthal and the injureds’ parents had signed an agreement subject to Private law: The company paid a lump sum of 100 million DM, which led to the establishment of a *Foundation for the relief of handicapped children* (later on renamed to *Contergan Foundation for People with Disabilities*). The foundation then distributed the compensation payments according to the following scheme (Table 4):

Table 3: Quantification and economization of pain (Translation from: German Bundesanzeiger N° 189, 06.10.1973).

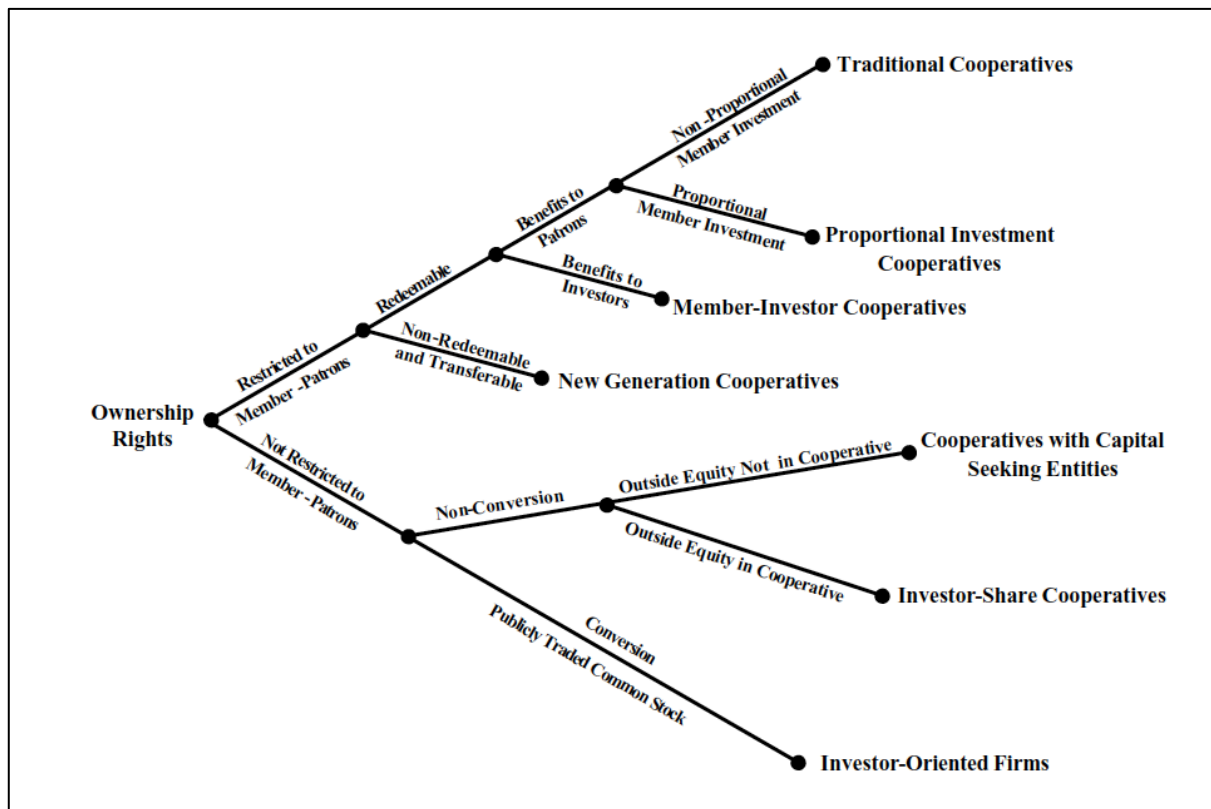
Damage Points	Compensation Payoff	Monthly Pension
1-4,99	2.500,- DM	–
5-9,99	5.000,- DM	–
10-14,99	7.500,- DM	100,- DM
15-19,99	7.500,- DM	150,- DM
20-24,99	15.000,- DM	200,- DM
25-29,99	15.000,- DM	250,- DM
30-34,99	12.500,- DM	300,- DM
35-39,99	12.500,- DM	350,- DM
40-44,99	15.000,- DM	400,- DM
45-49,99	15.000,- DM	450,- DM
50-59,99	17.500,- DM	450,- DM
60-69,99	20.000,- DM	450,- DM
70-79,99	22.500,- DM	450,- DM
80-...	25.000,- DM	450,- DM

Table 4 presents a first column listing a quantitative indicator for a child's deformation, i.e., in total 14 categories of deformation ranging from rather harmless (1-4,99) up to the most serious (80-...) deformations. The second and the third column then allocate to each of these categories a certain amount of monetary compensation, both in terms of a lump sum and a monthly pension. This form of quantification displays more than the mere economization of a moral problem. Rather, we find that quantification and economization fall apart into two well-distinct processes: In a first step, the individual problems with Contergan were made an object of medical organization. Not until this medical ranking had been set up, in a second step, a translation between a medical and an economic form of calculation could take place.

Conversion of functions as function: a discussion

The instructive typology of cooperative models developed by Fabio Chaddad and Michael Cook (Chaddad & Cook, 2004, p. 352) allows for a relatively precise localization of Fonterra's actual state within the process of conversion from a traditional cooperative with an emancipative political mission to an economic organization (cf. Fig. 2):

Figure 2: Alternative cooperative models: an ownership rights perspective (source: F. R. Chaddad & Cook, 2004: 352).



According to the authors (Chaddad & Cook, 2004, p. 350), traditional cooperatives and investor-oriented firms constitute ‘polar organizational forms’. Traditional cooperatives restrict ownership rights, political participation, and economic returns to member-patrons. Control rights are normally not proportional to an individual member’s economic contribution. Variations of the traditional model are then commonly linked to the liberalization of the world agricultural market, which confronted co-operatives with a more competitive environment and the corresponding needs for capital sourcing strategies. Moving a first step towards investor-oriented firms, in the case of a proportional investment cooperative, member-patrons are expected to invest in due proportion to their patronage, while in the case of a member-investor cooperative, members can over- or under-proportionally invest in the cooperative; returns are then allocated both in proportion to patronage and the amount of capital invested. In what the authors call new generation cooperatives, ownership rights are already ‘in the form of tradable and appreciable delivery rights restricted to current member-patrons. In addition, member-patrons are required to acquire delivery rights on the basis of expected patronage so that usage and capital investment are perfectly aligned’ (Chaddad & Cook, 2004, p. 350f). In this sense, new generation cooperatives internally reproduce the basic principle that once allowed for the takeoff of the economy: the conversion of politically granted into transferable and thus tradable rights. New generation cooperatives thus virtually represent the tipping points at which an organizations turn from a rather politically motivated classical cooperative into a rather economic corporation. The models further down the branch in Figure 3 then describe the increasing opening to external investors as final steps to the complete conversion into a primarily economic organization.

Against this background, we find that Fonterra started as a traditional cooperative, increasingly sourced extra capital from both member-patrons and the New Zealand government until the liberalization of the World agricultural market forced it into the adaption of and adaptation to free market principles. While Fonterra was still considered a member-investor cooperative by the authors in 2004 (Chaddad & Cook, 2004; Cook & Chaddad, 2004), it has since then been discussed as a new generation cooperative (Beverland, 2007), i.e., as a hybrid between a cooperative and cooperation (Dana & Schoeman, 2010). At the moment, the Board of Directors is elected with proportional voting while the elections for the Shareholders’ Council still follow the traditional one-man-one-vote philosophy (Chaddad & Iliopoulos, 2013). The elections of Fonterra’s government are based on census suffrage, which means that economic principles already define the weight of a considerable part of the votes, while the electoral procedure for the Shareholders’ Council can be considered a concession to Fonterra’s organizational memory, which still reflects elements of an organizational culture that cannot be

so readily forgotten, as World markets demand. With a focus on this particular tension, we find that a brief analysis of the history of the conversion of a New Zealand cooperative to the global dairy giant Fonterra therefore allows for a marking of the distinction of a primarily political or primarily economic organization. The fact that a considerable number of cooperatives did not engage with this balancing act and converted to economic organizations therefore supports the idea that organizations may have, change and even loose^{ix} their main function(s). The Fonterra case as such challenges both the idea of multi-referential functional monophony and the idea that functional polyphony is a special case of organization. What is more, it makes a case for the assumption that an organization that is observed as a monophonic organization today might turn out to be a polyphonic organization with a different pace of change. Considering that organizations are multifunctional by nature, we also consider change as constitutive of organizational realities (Tsoukas & Chia, 2002) and assume that even the most monophonic organizations will turn out to be polyphonic ones in the long run. In the same vain, monophonic organizations would appear as nothing but empirical snap-shots or ideal-typical categories that serve for hardly more than providing a theoretical background for the analysis of functional polyphony. In other words, the observation of functional monophony qualifies for a theoretical prerequisite rather than an empirical finding of research in organizations.

In looking at the supporting material provided by the *Google Ngram* analysis, we find that the conversion of main functions does not stop at the borders of individual organizations, but also can be observed with regard to the organization of larger social systems. As illustrated in Figure 3, the history of modern societies can indeed be written in terms of a secularization and politicization of society. The open question is still whether such changes on the level of the organization of societies are because large numbers of organizations change their function system preferences, or because large numbers of organizations with particular function systems preferences lose out to organizations with other function system preferences. In both cases, however, organizations can be considered indicators for the function system preferences of larger social systems.

This idea is also supported by the second case of the *Contergan Foundation for People with Disabilities*, which was chosen not least because it demonstrated in the most compact way that an organization's function is a function. In the present case, this function was in converting a medical problem into an issue that could be solved in terms of monetary payments. The Contergan-case suggests that there is not only the conversion of an organization's main function(s), but also the fact that an organization's function can be the conversion of functions. The handling of more than one function system reference therefore has what it takes to be a core business rather than only a secondary business of organization.

Multifunctional organization: a critical update for research programs in management and organization

The cases presented in this article support the idea that polyphonic or multifunctional organization rather than monophonic organization is the standard case of organization. In concrete terms, the case of the conversion of agricultural co-operatives in the context of the liberalization of the world agricultural market indicates a) that organizations can change their function system preference(s) and b) that this change can in some cases take several decades. This finding suggests exercising caution when it comes to the concept of organizational monophony, i.e., the idea that organizations have only one main function. If an organization can change its main function, then regardless of the pace of this change, it can hardly still be considered a monophonic or mono-functional organization. The case of the German Contergan Foundation takes this idea one step further by supporting the idea that we cannot only observe the conversion of an organization's function system preferences, but also the conversion of function systems as an organization's main function. In this sense, we suggested that functional polyphony is not a secondary, but rather the core business of organizations. Future research might be interested in observing this multifunctionality through the lens of organizational synaesthesia (Warren, 2006). A Google Ngram peek on functional differentiation finally furthers the idea that changes of (primary) function system preferences are not only a matter of individual organizations, but also a matter of entire societies.

Against this background, we might assume that organizational heterophony, i.e., the tendency of organizations to equally consider all function systems, is a theoretical artifact rather than an empirical finding. At the same time, however, organizational heterophony can be considered an artifact that qualifies for an explorative null hypothesis of functional research in organization and therefore for a most relevant background for research in factual function system preferences of organizations and their environments. We therefore can conceive of contemporary organizations as *programmable* decision machines, with this programmability not sparing functional differentiation.

In this sense, the observational leap from mono-functional to multifunctional organizations simply traces a development that can be observed for a number of other machines. Looking at the printing machine, we find that it was not the speed of printing, but rather the movable letters (read: the –analog – programmability) that made the Gutenberg press a trigger of modernization. In the same way, the chief attraction of the Jacquard loom was not in the scale, but rather in the scope of high scale production enabled by one of the first forms of digital programming. In both cases, the key to the *Next* key technology was in the distinction of the machine's program and function. In fact, there has been a long tradition of considering a machine's program to be embedded in the machine's architecture, which is even true for the computer, the incarnation of the programmable machine, that only recently started to be disabused as an advanced calculator. In a similar manner, an organization's function is no longer given in an organization's architecture. Rather, given a critical update of research programs in organizations, organizations might develop multifunctional identities as strategic resource. In the same vein, organizational research might find that functional monophony in organization is not a starting condition, but rather a rare special case, or just an antiquated image of organization. Noticeable biases to particular function systems would therefore turn from assertions to research problems, and organizations to indicators of general trends in functional differentiation.

For both scholars and practitioners in management, the idea that organization is as much about function system preferences as it is about specific configurations of variables, like age, culture, or gender, opens up not only new margins of experiments with organizational identity, but also still largely unexplored spaces of decision making. If we recall Heinz von Foerster's postulate that '(o)nly those questions that are in principle undecidable, we can decide' (von Foerster, 1992, p. 14), then the incommensurable nature of function systems ensures that the maps of functional differentiation show us the way to inexhaustible sources of needs for decision, management, and organization. For members and managers of organizations, the concept of functional differentiation therefore represents a veritable next frontier in identity work. As omnipresent the form of differentiation of modern societies is in decision-making, as under-researched is its impact on decision processes is still analyzed by neither researchers nor members. Yet, the mere relevance of functional differentiation as well as the fact that there are trends in (the organization of) functional differentiation confronts members and managers with number of questions quite fundamental in terms of both strategy and operations such as:

- What functional system is in the center of gravity in their organization?
- Have the gravitational forces of their organization changed?
- Have they spotted a new fixed star in their organizational universe?
- Is their organization about to develop a new functional identity?

Questions like these help to imagine a hospital ruled by economic budgets, a bank dominated by micro-politics, or a research lab basing their decisions on legal constraints first, and then to take action regard these situations if they are considered inappropriate. It all starts with a simple variance analysis comparing the organization's functional self-conception with the reality of its own decision-making processes. In doing so, members, managers, and researchers of organizations would not foster the impression "that modern society is built through walled-off, separate, functional subsystems" (Fontdevila, Opazo, & White, 2011), but rather draw their attention to a set of *variables* (sic!) that has been up until now widely neglected by social sciences in general and management research in particular. In fact, larger parts of research in management and organization are focused on categories that rather correspond to earlier forms of social differentiation. The aim of these final lines is therefore to sketch out what organization and management research could observe if it refocused part of its attention away from the time-honored variables of segmentation or stratification such as age, gender, race, nationality, culture; and consequently also focused on the variables of functional differentiation and their impact on organizations. Such an approach would then allow for the observation of how and why the dynamic interplay of function systems shapes the face of contemporary and next organizations, markets, and societies. In doing so, management theory could ask as to how management can act on stages whose designs are set by functional rather than theatrical properties; how personal or organizational identities emerge as a climate of functionally differentiated opinions; and how the observation of specific constellations of function systems spans a multifunctional horizon for decision-making. Consequently, the observation of organizational multifunctionality calls for a search for complementary forms of multifunctional management, the discovery of which could prove beneficial in a considerable number of management subfields.

If we look at *entrepreneurship and innovation management*, then we find evidence for the fact that a considerable part of business model innovations operate at or across social borders. The export of a good or service from one segment of society to another is an example of how business models are built across the borders of segmental differentiation. Further

business models have been extensively observed to benefit from the diffusion of innovations across the borders of social strata. What could hence be more natural than to provide entrepreneurship and innovation management theory and practice with the tools to observe blue oceans at or across the borders of the function systems?

The lens of functional differentiation could also shed new light on discourses of *corporate social responsibility*, potentially leading to both a more differentiated and more integrated view of the social in CSR, which is as of now negatively defined in most cases as the container concept for everything that is not economic.

In a similar way, functional differentiation could set a new course in *strategic management*, where continuous amendments to models such as the series of tools formerly called PEST indicate a need for higher resolution access cues to an organization's (social) environment.

In *accounting*, functional differentiation could bring new life and more complexity to what is so far summarized rather than defined as social accounting.

Last, not least, *market and consumer research* could benefit much from a new set of variables that helps to distinguish and address what is called market or consumer segments. This thought can be pursued further up to a point where management observes multifunctional markets.

The supreme discipline of multifunctional management, however, will be the management of functional differentiation itself in the sense that management cultivates both a reactive and an active attitude towards the constellations of function systems featured by particular organizations or regions of society. Management can in fact reconsider its role with regard to the fact that particular areas or eras prefer particular function systems to others, a situation which management might indeed want to reinforce or change in one context or another.

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ⁱ In the same way, the concept of life does not include its physical conditions. Our organism is not the air that we breathe. Systems necessarily *are not* what they require.

ⁱⁱ 'What Simmel had in mind was that each individual is unique in the sense that his pattern of group affiliations is never exactly the same as that of any other individual' (Bakken & Hernes, 2006, p. 125) Reading this, we might feel tempted to assume that groups consist of individual persons and that it is again persons, now simply in plural, who make persons, in the end. Keeping closer to the original title 'Die Kreuzung sozialer Kreise' (The Intersection of Social Circles), however, we find that Simmel anticipated a way of thinking that still only few want to follow. It is indeed still quite common to conceive social relations as ties of knots of individual behavior. Simmel, however, displays the individuals' role of tying social circles, in other words, his sociology is focused on knots of social relations that are tied by individual behavior. In such bringing of the social to the center of sociology and moving 'the individual' to the intersection of social circles (read: at the borders of the social), he clearly paves the way for Luhmann's historical Defenestration of the Individual. For Luhmann, society does expressively *not* consist of individual humans or 'their' contributions to communication, but rather in the eigen-logic of communication itself. Using the metaphor of a score we might say that Luhmann is not interested in how individual tones are produced, but rather in the laws of harmonics.

ⁱⁱⁱ Yet problems with these effects may arise whenever decision programs themselves are considered beyond decision, and thus seem to elude their own organization. These problems, however, only arise if organizations actually are considered *autopoietic* forms rather than semantic by-products of decision communication in the same manner as persons are *made* at the interfaces of interactions.

^{iv} Families (Fuchs, 1999; Henkel, 2010; Mayntz, 1988; Tyrell, 1979), love (Andersen & Born, 2008; Burkart, 2005; Künzler, 1987; Leupold, 1983), the moral (Reese-Schäfer, 1999, 2007; Schwelger, 2008), culture (Burkart, 2005; Henkel, 2010; von Rosenberg, 2009), social work (Baecker, 1994; Fuchs, 2000; Maass, 2009; Scherr, 2001), sexuality (Lewandowski, 2004), tourism (Stichweh, 2005), and vesture communication (Bohn, 2004) are to be considered disputed candidates.

^v Owing to a stimulating exchange with Michael King, University of Reading, UK, earlier versions of the present table (Roth, 2013a; 2014b, p. 104; 2014c, p. 38) have been updated. In this sense, the present version represents what the earlier versions have always been: an increasingly consolidated basis for discussion.

^{vi} As organizations are defined as systems of decision communication, and not as systems of interactions, there are no interactions in organizations, but only interactions on organizations. Interaction-focused approaches to organizations will therefore hardly result in more than footprints of organization.

^{vii} Since the English language splits the political system into politics and policy, we entered the more frequent of the two concepts, which is policy.

^{viii} The importance of concepts is often defined in terms of the frequency of their occurrence in given corpora, which is considered 'the simplest and most impartial gauge of word importance' (Kloumann et al., 2012, p. 1) or the popularity of objects, ideas, and persons (Bohannon, 2011b; Ophir, 2010). This interpretation of word importance does not refer to cases where word importance is inversely related to word frequency (Baeza-Yates & Ribeiro-Neto, 1999). Such an indexical approach to word importance would only make sense if the present article were interested in comparing the discriminatory abilities of the concepts involved. All function systems, however, are on the same level of analysis and therefore feature the same degree of discriminatory 'power'.

^{ix} With regard to the case of the Mondragon Corporacion Co-operative (MCC) as presented by Sonja Novkovic Novkovic (2008), the conversion of agricultural cooperatives can also be interpreted as a process of functional de-polyphonization, i.e., in this case the loss the MCCs political and educational function.